FIRE-PROOF WOOD

1900

FIRE-PROOF WOOD

NEW YORK
THIRTY-EIGHT PARK ROW
MDCCCC

Compliments of

NEW YORK FIRE-PROOF WOOD CO.

OFFICES:

POTTER BUILDING, 38 PARK ROW,

BOROUGH OF MANHATTAN,

NEW YORK CITY.

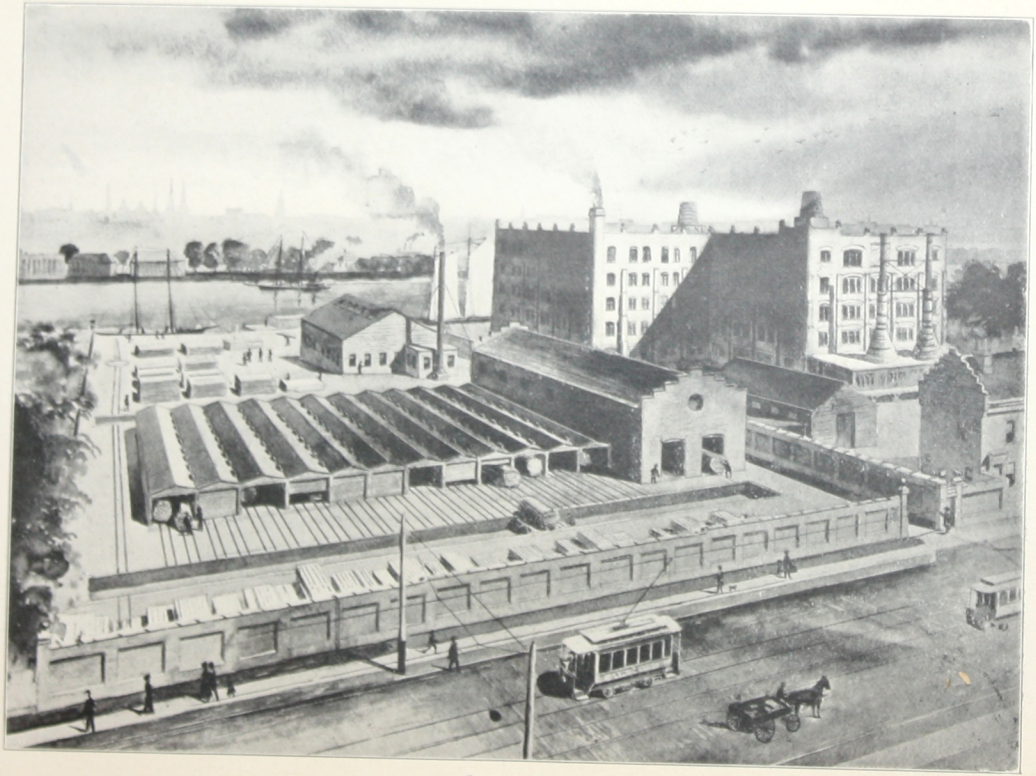
WORKS:

399 VERNON AVE., LONG ISLAND CITY.

BOROUGH OF QUEENS,

NEW YORK CITY.

August 1st, 1900.



VIEW OF THE WORKS.

WOOD THAT WILL NOT BURN

A DISCOVERY WHICH PROMISES IMMUNITY TO OUR CITIES AGAINST FATAL AND DESTRUCTIVE FIRES.

By Cleveland Moffett.

THE great calamities by fire which have startled the community during the past year have turned men's thoughts strongly to this danger ever threatening our homes and cities,—a danger which will be a perpetual menace to life and property so long as inflammable wood is used in all building construction in our towns and cities. There is no resisting flames so long as this wood will not resist flames. Nor can anything be fire-proof unless this wood be fire-proof.

Let us take one case, fresh in every memory, that dreadful disaster of June,

1900, at the Hoboken wharves. Here are three great liners resting peacefully at their docks, aswarm with life, longshoremen loading and unloading, crews at their various duties, and visitors. On the wharves is another swarm handling the immense cargoes. Suddenly comes a spark, a flame, a driving wall of fire and, behold, some hundreds of unfortunates are left to die in awful agony, imprisoned in white-hot hulls, or, cowering on wharf-ends between fire and water, to burn or drown. And three costly steamers are drifting to ruin, blazing as they drift, and threatening all the water front. And behind them the wharves rage red like rows of furnaces, feeding on precious merchandise!

Millions of dollars gone up in flames, and human anguish smothered in smoke, all because these wharves were wooden piers on wooden piles, built over with wooden sheds (inflammable wood), and because the three steamers, for all their luxury of fittings, were like wooden houses inside iron walls, (conveniently pierced with draft holes, one might say), quite ideal torture traps, for what will burn better than these wooden decks (inflammable wood) tar-soaked and sun-baked!

It is easy to call for stone piers and metal wharves, after the fashion of Europe, but while these are building (during the next half century, say) and while the city is collecting the huge sums needed to line the twin rivers with granite and steel, the fact remains that twenty miles or so of wooden wharves about New York await from day to day just such a fate as that of Hoboken.

Week by week other steamers with the same facilities for death come up to other wooden wharves, crowded as those were with bales of cotton, barrels of spirits, etc.—huge bon-fire structures only needing some careless match to offer another sickening lesson how our ships and their freight should *not* be handled. How many lessons like that will be required? How long before the voice of the people's wrath will speak out? The remedy is obvious, and the change from wooden wharves that perpetually endanger the city and its shipping to wooden wharves that will endanger *nothing* might be accomplished in a single year. As for the steamers, they have only to follow the example of the American navy (I shall speak of this presently in detail) and use for decks and fittings wood that will not burn.

Here is another instance, quite recent, of the mischief wrought by fire. Listen to that laconic newspaper message (April, 1900) of the great Ottawa fire:

Dead, seven.
Homeless, 15,000.
Destitute, about 8,000.
Buildings burned, 3,000.
Hands out of work, 5,000.
Value of property destroyed $15,000,000.

And this but one case among many. Take the great London fire of 1897. Acres of shops and warehouses swept away, engines fighting the flames for days and the toil of ten thousand lives gone up in smoke. Think of Paris and the Charity Bazaar horror with untold hundreds caught in that shameful furnace and held there to their deaths, some of the best names of France. And again in Paris only the other day remember how fire wiped out that precious house of Molière with art treasures never to be replaced and left a beautiful young actress in the ruins. Think of the Windsor Hotel in New York, a serious quiet place on famed Fifth Avenue, with solid comforts for the rich and many fire escapes. Burned to the ground in broad daylight and half a hundred guests

burned with it. Think of the fires in New York homes within immediate memory: the Pulitzer home, the Andrews home, the Raymond home, beautiful residences, built without care for cost, fitted with devices against flame much recommended, yet the sleepers here, masters and women and servants awoke on those fateful nights to choice between dying where they were or leaping down to death upon the pavement. And if this be true of homes for the rich what may we expect in swarming tenements!

And statistics show that things are getting rather worse than better in this matter. In 1897 property losses from fire in the whole United States amounted to $116,000,000, these increased in 1898 to $130,000,000, and in 1899 to $153,000,000, more than twice the corresponding loss in Great Britain. In New York City the fire losses for 1899 were $7,000,000, as against $3,000,000 in 1898. No wonder fire insurance companies are tottering to ruin. No wonder the *New York Times* exclaims: "The average New York dwelling is a fire trap."

The fact is all our modern city buildings, private dwellings, hotels, theatres, business structures, all with no exceptions are fire-traps unless they be absolutely fire-

proof, and we shall presently see that it is one thing to give a building the name of fire-proof and quite a different thing to make it really proof against fire. As to fire escapes, coils of ropes and other means offered for the calming of fears, Fire Commissioner Scannell of New York gives this opinion: "In my belief all the fire escapes that can be put on a building and all the life saving appliances that can be put into it, will not prevent death in a crowded hotel when the hotel is not fire-proof."

"This very tall building that I have erected," says some self-satisfied architect, "is fire-proof because it is made of steel and stone and bricks, therefore it cannot burn down."

Presently the building does burn down and the public marvel. After several similar burnings (the Home Life Building, the building of the Manhattan Savings Institution, etc., etc.,) the public marvel no longer but lose all confidence in "fire-proof" buildings, while comic paragraphers jest on the subject: "When is a fire-proof building not a fire-proof building?" they query, and answer: "Nine times out of ten." Which is really not a joke but a grim understatement, for the testimony of experts

is that "Ninety-five per cent. of the 'fire-proof,' buildings in New York are liable to destruction by fire."

The reason for this is patent to a casual consideration; although iron and stone and brick and terra cotta will not burn, wood certainly will burn unless rendered fire-proof, and in more than ninety-nine per cent. of "fire-proof" buildings in New York the wood has been left inflammable and it is amazing how small a quantity of wood, once it is on fire, will suffice to twist and collapse the iron frames, to bulge the stone walls, to destroy the building. This wretched phenomenon is becoming so common now that people are wearying of it and of the constant danger; there is growing conviction that a matter of such vast concern to humanity should no longer be left to chance, and Professor Stillman of Stevens Institute probably voices intelligent opinion when he says: "I think there should be a law to compel the use of non-inflammable wood in all large cities."

Most certainly there should be such a law and will be so soon as people understand that a sure and available process of making wood fire-proof has been perfected. They will refuse to take chances on being burned

proof, and we shall presently see that it is one thing to give a building the name of fire-proof and quite a different thing to make it really proof against fire. As to fire escapes, coils of ropes and other means offered for the calming of fears, Fire Commissioner Scannell of New York gives this opinion: "In my belief all the fire escapes that can be put on a building and all the life saving appliances that can be put into it, will not prevent death in a crowded hotel when the hotel is not fire-proof."

"This very tall building that I have erected," says some self-satisfied architect, "is fire-proof because it is made of steel and stone and bricks, therefore it cannot burn down."

Presently the building does burn down and the public marvel. After several similar burnings (the Home Life Building, the building of the Manhattan Savings Institution, etc., etc.,) the public marvel no longer but lose all confidence in "fire-proof" buildings, while comic paragraphers jest on the subject: "When is a fire-proof building not a fire-proof building?" they query, and answer: "Nine times out of ten." Which is really not a joke but a grim understatement, for the testimony of experts

for fire-proof wood in their construction, and already the battleships and cruisers Iowa, Brooklyn, Chicago, Wisconsin, Alabama, Illinois, Kentucky, Kearsarge, Miantonomoh, Ranger and Charleston have been fitted with non-inflammable wood, as well as the gunboats Helena, Nashville, Wilmington, Annapolis, Vicksburg, Newport, Princeton, Wheeling and Marietta.

As to the esteem in which this fire-proof wood is held by our naval experts the following lines from the *Army and Navy Register* of May 21, 1898 give eloquent testimony: "The war with Spain has already furnished some notable examples of the value of fire-proof wood on board ships of war. The reports show that in the engagement at Cardenas, the 'Winslow' was in all probability spared from total destruction by the fact that under the severest exposure none of the woodwork on her ignited. And the same conditions prevailed on board the 'Wilmington.'"

And there is no doubt that lack of fire-proof wood in the Spanish fleet contributed in no small measure to its destruction, as was the case with the Chinese fleet fitted with inflammable wood, against the Japanese fleet fitted with non-inflammable wood.

to death when there is no longer any need of it ; they will insist upon having fire-proof wood about them since the other kind causes most of the fires. One realizes this in looking over the London fire report for 1898 which states that of the 3,585 London fires that year, 174 resulted from fire set to curtains from gas brackets, 241 from sparks, 221 from the upsetting of lamps, 230 from candles, 122 from children playing with matches, 352 from lighted cigars, matches and tapers, etc., carelessly thrown down. It is altogether likely that these fires would have burned themselves out harmlessly had the surrounding doors, floors, panels, window sashes and other wood-work been fire-proof and therefore incapable of strengthening and spreading the blaze from paper and light material.

Let it be borne in mind that we are not groping now in the realm of speculation, we are not considering possibilities or projects, we are dealing with plain facts ; nothing is more certain than that all kinds of wood used in city buildings may be rendered non-inflammable, and may be rendered so easily and cheaply. So well is this understood by the Washington authorities that all contracts now for war vessels call

buildings shall be constructed of fire-proof wood. And in New York there are plain signs that people are taking warning from recent disasters. Several of the towering office buildings on Broadway are really fire-proof now in woodwork as well as in steel and stone, notably the R. G. Dun Building, the Queen Insurance Building and the Commercial Cable Building. This last named was probably saved from destruction in June, 1899, because its builders had been wise enough to protect it with that best kind of fire insurance, the kind which consists in making fire impossible. One Sunday morning in the month mentioned a sudden blaze broke out in a basement of this building where quantities of paper, telegraph blanks, etc., were stored. Instantly the basement was in flame. A little later the basement was blackened with smoke and ashes, but cold and dangerless. The paper had burned itself out, the fire-proof doors and walls and window frames had neither taken fire nor been able to transmit fire and the great building with its contents was safe.

As a final indication of opinion's drift I may refer to a provision added to the New York building code in December, 1899,

The one suffered terribly from fire, the other escaped.

A thrilling picture is drawn by Captain Randle of the "St. Louis" of the scene when those ill fated Spanish battleships went down seething with fire. "The iron plates were red hot," said he, "from the burning woodwork inside, and there were three hundred poor devils of Spanish sailors, unable to swim, trying to keep their heads above water by holding fast to these plates. It was a pitiable sight. If they let go they drowned, if they held fast they had their fingers burned off. We could see them from the rescue boats clinging to that sizzling iron as long as they could with one hand and then putting up the other for its turn of agony."

In England, too, there is evidence of a growing realization that the use of fire-proof wood is a matter of extreme importance to a community. The British Museum has been fitted with fire-proof wood, so has the Crystal Palace, so has Queen Victoria's yacht, so has Charles Wyndham's admirable new theatre, successor to the old Criterion. In France a similar advance is seen in the Government requirement that all floors, booths and partitions in the Exposition

answers fairly well and is cheaper, is unsatisfactory for other reasons, and so through a long list of fire-proofing liquids, each one shows some drawback. This one absorbs moisture and makes the wood rot, that one corrodes nails and metals, another becomes volatile and loses its virtue, another is poisonous to the touch and another injures the wood.

And no sooner had the experimentors discovered a suitable liquid than a second difficulty met them, to make this really penetrate the wood, that is, thoroughly impregnate every fibre of it, for it is a fact that certain dense woods may be soaked or even boiled in a liquid for months and show but slight penetration. Plainly a plank or beam is not fire-proof so long as any smallest part of it even at the core will yield to fire. Boiling, therefore, would not do, something better must be tried. Many things were tried and finally by slow evolution came the present plan of forcing the fire-proof liquid into the deepest wood pores, and for a time it was thought necessary to prepare the wood by softening it under live steam and sucking out its natural pith and juices. This, however, has proved a dangerous expedient and the perfected process simply

requiring that all floors and window jams in certain buildings shall henceforth be made of fire-proof wood. Within the next decade we may expect to see this requirement extended to buildings of all sorts and to all wood used in such buildings, not excepting desks, chairs, tables. And by that time we shall probably find fire statistics less gruesome reading.

Let us come now to this most interesting process of rendering wood fire-proof, and see what is done to beams and boards of pine, ash, oak and other woods that we know as inflammable to make them no longer food for flame. It is all very simple, the only wonder being that this ancient knowledge of the chemists has been left so long without practical application. For centuries any laboratory experimentor could have prepared some liquid that would make wood fire-proof if soaked well with it and allowed to dry. Tungstate of soda would do it, and silicate of soda and alum and sulphate of ammonia and scores of other things (a Russian chemist has discovered no less than ninety-eight fire-proof solutions) the best of them by all odds being phosphate of ammonia. But phosphate of ammonia is too costly and sulphate of ammonia, which

when you are ready set the two houses on fire."

The committee build the two houses, say ten feet square and thirty feet high. They support them on timbers at the corners so that they are lifted about four feet above the ground like tall boxes on legs. Both houses, except for the wood, are exactly alike, with windows, doors and a great square chimney in the middle of the roof to give a roaring draft. Now resinous logs are piled against the walls and these are saturated with kerosene. The space within walls is heaped with branches, light boards, shavings, or any combustible material, all swimming in kerosene. The space underneath is stuffed with whatever will make the hottest fire and at a given moment matches are touched to both houses and the test is on.

In every experiment of this kind the result has been the same. There have been no failures. For fifteen or twenty minutes both houses roar with flames; after that only one house roars, the other has gone the way of ordinary wood under fire—has been consumed. Now pile more logs against this fire-proof house, pitch in barrels of shavings, pour on more kerosene, gallons

squeezes fire-proof liquid into the natural wood, then dries the wood. In a moment we shall follow this process step by step, the point just now being that this treated and dried wood, when examined under the microscope, shows fire-proof crystals spread through all its pores, which means that the wood cannot burn, that fire can no more spread through it than through asbestos. The wood is now fire-proof like asbestos. It looks like ordinary wood, smells like ordinary wood, has all the properties of ordinary wood, but it will not burn.

"Is that strictly true?" some one asks in natural incredulity. "Will it not burn a little? Would planks and boards thus treated stand a severe test by fire? Would they stand an absolutely impartial test?"

This question has been asked many times, in London, in Boston, in New York, in various cities, and has been answered each time in the same way: "Select an open lot," say the makers of fire-proof wood to a committee of citizens. "On this lot build two wooden houses exactly alike, except that one is made of ordinary wood and the other of fire-proof wood. Do everything yourselves, see that everything is fair and

under similar circumstances the best so-called fire-proof building would have fallen in ruins in half the time. All these things are a matter of record for any one to verify, and all men may know that fire-proof wood, really proof against fire, confronts us to-day (and the flames) "as a condition, not a theory."

I had the pleasure, a few weeks ago, of visiting the testing and experimenting plant of the United States Fire-Proof Wood Company at Philadelphia and of being instructed in what goes on there by the consulting engineer, Joseph L. Ferrell, who is also the inventor of the new apparatus and process. First I saw three one-inch boards of white pine placed in a massive cylinder and squeezed so full of liquor that their weight increased from 33 pounds to 72 pounds or 110%, this after forty-five minutes in the cylinder, and they would have increased 200% or even 250% with prolonged pressure. It seems impossible that a cubic foot of dry wood and a cubic foot of liquid can be made to unite into a cubic foot of merely wet wood. "Where has all the liquid gone to?" one asks. Into the wood, of course, which is never really solid but full of countless tiny spaces or pores, some kinds being much

of it, open all the doors for stronger draft, see how the windows gape open already where the glass has melted. The fire department gentlemen of the committee agree with the fire insurance gentlemen that there is heat enough under that wooden house to melt a floor of iron and stone. Yet the wooden floor stands.

For half an hour this flimsy-looking board structure is wrapped in fire, fierce flames within, without and underneath, a column of fire shooting high above the chimney; it seems each minute as if it must collapse the next; it does not collapse; for another half hour the fire is forced by every means, but the house holds its own, the same for another half hour and the same result; for ninety minutes these boards of plain wood have stood in a furious furnace and not been destroyed. At last the committee is satisfied, they let the flames die out, they look at the walls and floor and roof. Boards charred, blackened, somewhat worn away in places, but the house is structurally intact, the floor is sound underfoot, no part of it has burned, no piece of it has been on fire at any time. Naval contractors, fire underwriters, chiefs of police, architects, building experts in every line admit that

six hours, three inches thick nine hours, and so on. In contrast to this, other makers with their low-pressure cylinders would take eighteen hours to impregnate one inch white pine (where we take one hour) and three or four days to impregnate two inch oak or mahogany.''

Now Mr. Ferrell explains the process in detail. Out of yonder large tank the fire-proofing liquid is pumped into this cylinder, inside of which the planks are piled and the massive end door closed upon them. This strong steel door, by the way, is Mr. Ferrell's invention and closes from inside the cylinder so that the greater the water pressure against it the harder it jams against the end, whereas the old style of door closed from the outside in and required a complicated system of heavy bolts to keep it shut and even so was apt to leak under great pressure. A child could operate this door of Ferrell's contriving.

Now the cylinder is full and the mercury column above it begins to rise, the higher it stands the greater the pressure. The little pump works constantly, chunk-chunk, slowly driving in more liquid to replace what penetrates the wood. No shock in this driving, but an even, steady squeeze, thanks

less porous than others and therefore able to drink up less liquid.

"Under how much pressure," I asked, "is your fire-proofing liquid driven into the wood?"

"That varies with the kind of wood and with its thickness. Three hundred and fifty pounds to the square inch is sufficient for soft woods, one-inch oak requires 600 lbs., two-inch mahogany requires 800 lbs., and so on up to 1,200 lbs. I may say that this capacity for using high pressures is a strong point in our process. Other makers subject their wood to live steam and vacuum suction before driving in the liquid and that renders the fibre pulpy so that it will not stand more than 80 lbs. to the square inch. The consequence is it takes them days to accomplish what we do in a few hours."

"How do you know when a certain lot of wood has been in the cylinders long enough to make it fire-proof all through?"

"By experience. We find that one hour is enough for soft woods one inch thick, three hours for hard woods one inch thick. Soft woods two inches thick need one and one-half hours, four inches thick five hours, six inches thick six and one-half hours. Hard woods two inches thick need about

—hard woods, and soft woods of greater thickness, proportionately longer. By the latest improved methods which we use, all kinds of wood are dried with great rapidity, and without checking or warping."

"In what form are the chemicals after the wood is dried?"

"In the form of minute crystals."

"Can one see them?"

"With the microscope, very plainly; they nestle in all the pores."

"Do they add much to the weight?"

"From five to ten per cent., as the wood is more or less porous. They add about 6% to the weight of oak, about 9% to the weight of pine."

"Is there any danger that these chemicals leave the wood after a lapse of years or lose their fire-proof qualities?"

"None whatever, since they do not volatilize nor suffer change of any sort; they are imprisoned in the wood and cannot leave it."

"And you mean to say that these minute or microscopic crystals are sufficient to protect the wood against flame?" Already I had asked this question two or three times and had it answered, but life-long prejudices are stubborn things, and I had been

to a drum-shaped accumulator, a restless iron mass that dances up and down on its black column, acting as a buffer against the hydraulic thrust. Other makers allow the pump strokes to act directly on the cylinder and thereby strain the wood, especially when soft, by a series of water blows or kicks not good for the fibre. No such danger here.

Having observed the process of impregnating the wood, I was now able to judge of its thoroughness, for planks and heavy timbers, pine, maple, oak, mahogany, that had been treated in the cylinder several days before were split open before my eyes and in every case, though the surface had dried somewhat from evaporation, the heart and inner layers were soaking wet, so wet that the liquid dripped to the floor. As for the white pine boards just treated, they fairly streamed out water when cut in pieces. There was not the tiniest spot anywhere in any of these boards and beams, not the place for a pin point that was not saturated. And some of them were six inches square.

"How long does it take the wood to dry after it has been treated?" I asked.

"From three to ten days. Soft woods up to two inches thick require three days,

and again I tried to make it burn, but burn it would not. It would glow red while the flame was on it and would char black, but became cold so soon as the flame was withdrawn.

"This Bunsen flame has a temperature of about 1800 Fahrenheit, now let us try the blast flame, which will take us up to about 3000 Fahrenheit; you know the ordinary fire-proof building goes to pieces in a fire of 1200 Fahrenheit."

So we tried 3000 Fahrenheit on the fire-proof pitch pine and it stayed fire-proof as before; would not burn at all. Then we tried 3000 Fahrenheit upon wood of other kinds, a dozen kinds, and the result was invariably the same, the untreated specimens were consumed in the old fashioned way, the fire-proof specimens resisted the fire in an absolutely new fashioned way, charred and glowed, to be sure, as asbestos does, but were dead the moment the attacking flame left them. Not even shavings would burn, while the dust of this fire-proof wood will actually put out fire when thrown upon it. Verily the most sceptical mind must yield before such a demonstration!

Then, merely for further impressiveness,

accustomed to see a piece of soft white pine burst into flame when put in a hot fire, now they tell me it will not burst into flame.

Mr. Ferrell smiled indulgently: "You shall judge for yourself. We have samples ready for you, all kinds of wood used in building."

We went into another room where a young man stood at a bench spread over with specimens of wood, nicely smoothed pieces about ten inches long and two inches wide and half an inch thick. There was oak, maple, ash, walnut, rosewood, mahogany and various sorts of pine, including the fat pitch pine that burns like a torch.

"Let's try that," said I, taking up the last named.

The young man set his Bunsen flame going and presently dipped the piece of pitch pine into its bluish tongue. Instantly the resinous wood took fire and blazed like a dazzling fire toy as the flames played on it.

"That's what happens to ordinary pitch pine when fire touches it. Now watch the piece which has been treated. It looks just the same, doesn't it?"

Undoubtedly it did look just the same, but it behaved very differently. The Bunsen flame made no impression on it. Again

the fire-proof wood as well suited to his purpose as any kind.

Then I asked about the cost of fire-proof wood.

"In the matter of cost," said Mr. Ferrell, "we enjoy a substantial advantage over all other makers of fire-proof wood. Our process costs us less and so we can afford to sell our wood for less. Our fire-proofing liquid, for all its superiority, is cheaper to make by one-half than any other in the market. The fact that we can use high pressures safely in impregnating the wood (thanks to our monopoly of the cylinder door and accumulator) enables us to prepare the wood in one-fourth of the time taken by other processes. Finally, in doing away with the steam and vacuum treatment we not only prevent injury to the wood fibre, but effect a substantial saving in operating outlay. Taking all this into account you may say that a man planning a house or an office building must add 10 per cent. to his estimate for wood, if he wishes it fire-proof, that usually means an addition of about one per cent. to the cost of the entire structure."

Here we talked fire insurance a little. It occurred to me that this use of fire-proof

we tried pieces of fire-proof cloth in the blast flame, flannel, lace curtains, mosquito netting and various light fabrics. Positively there was no burning them, and there is no burning anything saturated with this admirable fire-proof liquid. But these are side issues for others, this Company has its hands full supplying the demand for fire-proof wood. Let paper and lace curtains burn if they must; be sure that no city can burn, nor block of houses in a city, nor single house in a block, so long as the wood that composes these is able to resist fire.

Being satisfied now of the essential fact that the Ferrell process renders wood absolutely fire-proof, I inquired about the effect on the wood of this treatment, and I found that only slight changes result. The wood increases from 5 to 9 per cent. in specific gravity, and exhaustive tests show in it practically no difference from untreated woods in elasticity, compressibility and breaking strain. It takes paint and varnish better than ordinary wood; takes nails and glue quite as well, and is practically unchanged under carpenters' tools. A French sculpturer in wood, accustomed to work with delicate razor-edged tools, found

Various other things I learned in the course of my investigation, but these are the chief things, and I came away with the sincerest conviction that if in the future fire brings death and disaster upon us and upon our cities, it will be by our own plain fault. The safeguard has been found for us, is offered to us, and we have only to take it, pay a small price for it and be thankful.

wood ought to bring favorable rates from fire insurance companies. Mr. Ferrell agreed with me.

"They must lower their rates," said he, "as soon as they realize that we are lowering their risk, I might say wiping out their risk. Yes, I should say lower fire insurance rates will follow quickly on the general use of fire-proof wood."

"As the demand increases," I asked, "where will all the fire-proof wood be turned out."

"Not here; we shall act only as the parent company, bestowing rights to manufacture fire-proof wood upon other companies, which will set up large plants in various parts of the country, similar to that now being erected by the New York Fire-Proof Wood Company, which will operate over certain territory in New York, Connecticut and New Jersey, and will have three acres of yards on the East River in New York City. This plant, which is the first to be operated under our system, will contain a row of impregnating cylinders 116 feet in length, able to take 8,000 feet of lumber at a charge. Its total capacity will be 50,000 feet of fire-proof lumber a day, or 15,000,000 feet a year."

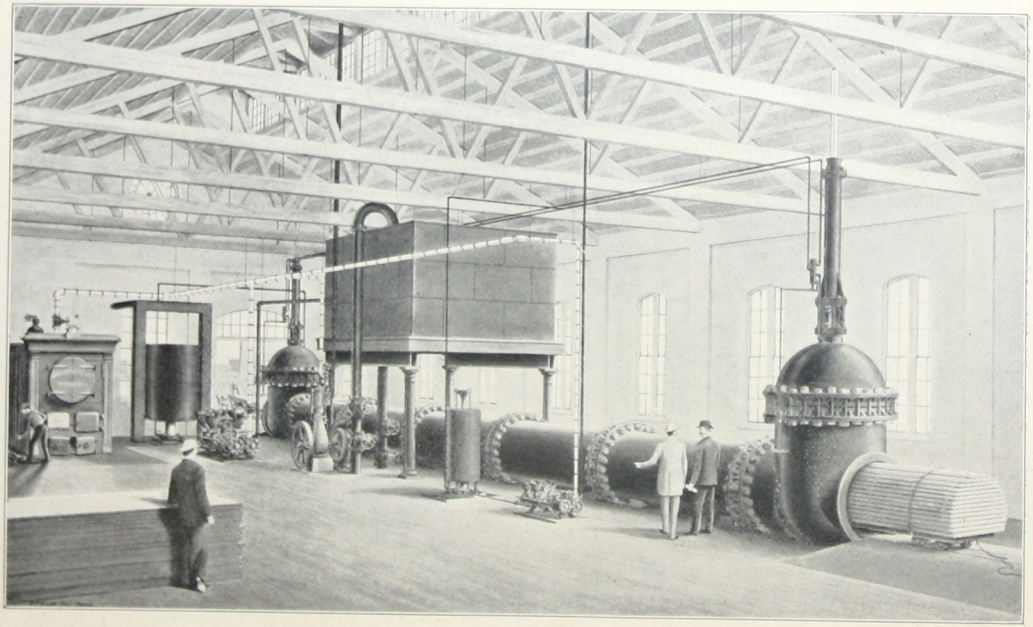
DESCRIPTION OF WORKS.

THE SITE of the Company's works at Ravenswood, Long Island City, Borough of Queens, consists of an area of nearly three acres on the East River, and includes a dock 200 feet in length, as well as ample stacking accommodations.

The works comprise a cylinder house, kiln-drying house, and boiler house and chemical store room.

CYLINDER HOUSE.—This is 135 feet long and 40 feet wide, and contains the treating cylinders or receivers, which are 116 feet in length and 50 inches in diameter, and are capable of holding a charge at one time of about ten thousand feet of timber board measure.

KILN-DRYING HOUSE.—Since the wood by treatment is saturated to the heart, special drying facilities are required. The Company's kiln-drying building is of the latest design, and is 135 feet long by 105



BOILER ROOM AND SMALL CYLINDER.

veyed to all parts of the works or grounds. In connection with the cylinder building and drying-house, are two traverse tables, which work on rollers in a traversing pit, and which afford a convenient method for conducting the cars loaded with wood from the timber yard to the cylinder house, from the cylinder house to the drying room, and lastly from the drying room to the store house. By means of these rails and traverse tables, cars are moved easily and safely, enabling timber to be taken either from the river or from the street, and discharged either into barges or into wagons, or if necessary into specially constructed store houses to await dispatch.

feet wide, fitted with the most modern drying machinery specially adapted for the work required. It has a capacity of over 300,000 feet of timber, which can be thoroughly and equably dried in from three to fifteen days, according to the thickness.

CHEMICAL STORE ROOM.—Here are stored the chemicals required to manufacture the fire-proofing solution. The building is 100 feet long by 50 feet wide, and will hold several hundred tons of the chemicals required, which are specially manufactured for the Company's use. This building also contains the two boilers, which are of the latest Coatesville pattern, of fifty horse power each. These boilers supply the necessary heat to the cylinders, and the steam required to work the pumps, drying fans, and other machinery. The mixing tank for mixing the fire-proofing solution is also in this building. After being prepared in this mixing tank, the fire-proofing solution is run into the large feed tanks, each having a capacity of 20,000 gallons.

ARRANGEMENT OF GROUNDS. — The grounds adjoining the buildings are laid out with lines of rails on which the cars or trolleys carrying the wood are easily con-

DESCRIPTION OF THE PROCESS.

THE TIMBER to be treated is stacked on low wheel trolleys running on tracks from the stacking yard into the treating cylinders or receivers. All varieties of wood in sizes up to 12 by 18 inches, and 16 feet long, have their pores filled under heavy pressure with liquid which makes the wood non-inflammable without impairing its strength or changing any of its physical properties, except to slightly increase its specific gravity. The essential apparatus consists of two steam boilers, the pressure and circulation pumps, a pressure accumulator, a charging tank, and the receivers. Besides these there are wood-drying kilns and chemical laboratories. The complete process, except artificial drying, requires only about an hour for timber one inch thick, and proportionately longer for greater thicknesses. It consists of placing the wood

is prepared in a 3,000 gallon steel mixing tank, and drawn thence into the large reservoir tanks, from which it runs by gravity to the receivers. The discharge pipe of 6x6x1 inch Worthington high pressure pump is connected to the accumulator cylinder, and the latter communicates with the receiver by a valved pipe of one inch internal diameter. The accumulator cylinder is six inches in diameter inside and six feet long, and its piston is loaded with sectional cast-iron disks of about 22,000 pounds total weight.

In the complete operation for the treatment of one lot of timber, the receiver gate is first opened by moving the small lever which commands the four-way valve on the pressure pipe to the cylinder just above the gate housing. The loaded trucks are then run into the receiver, more or less trucks being employed according to the quantity of lumber to be treated, and the door of the receiver is closed. A valve is opened and the receiver filled by gravity with the fireproofing liquid. The valve in the supply pipe is closed, and that in the pressure pipe partly opened, and the pressure is gradually raised to several hundred pounds with a rapidity regulated at will by throttling.

in the receiver, closing the gate, admitting the liquid, applying and maintaining the pressure for the required period, withdrawing the liquid and removing the wood.

The receivers are cast-iron cylinders 50 inches inside diameter, and 116 feet long, with walls 3 inches thick. The receivers are closed at both ends by the gate housings, large cast-iron chambers like a valve body with domed covers bolted on top. In these chambers the gate eight inches thick, moves freely, with clearance, between vertical guides. Its stem passes through a stuffing box in the top of the cap and is connected above it to the piston of a small vertical hydraulic cylinder, by which the gate is fully opened or closed in five seconds. When closed the outside of the gate engages an annular vertical seat of phosphor bronze, and is forced up against it by the interior pressure which, increasing, closes it tighter and tighter and, decreasing, relieves it from all friction and allows it to be opened by merely raising it. The concave bottoms of the receivers are covered with iron gratings on which are laid the tracks for the trolleys which carry the charges of timber. Under these gratings there is a coil of one inch steam pipes for heating the liquid. The fire-proofing liquid

The wood is now ready for delivery, and owing to the fact that the interstices of the wood are filled with antiseptic material, no rot can take place ; besides as the wood has been equably dried, the possibility of after-warping and after-shrinkage is avoided.

One great advantage of this process is that it is immaterial for how long or short a time the wood has been felled or sawn, as within ten days it is rendered non-inflammable, seasoned and dried.

It has been found by experience that an average absorption of 80 per cent. is ample to effect absolute incombustibility. The normal weight of seasoned white pine is 2¼ pounds per foot, board measure, and when it has absorbed 80 per cent of its weight of fire-proofing liquid, and has been thoroughly kiln-dried, it weighs 2½ pounds per foot, and shows no difference in color, or under cutting tools. Wood of all kinds and of all commercial sections, is treated to the heart and saturated to any required degree up to 200 per cent., with any one of the several liquids which have been especially developed for this process. The average number of minutes required to secure a saturation of 130 per cent. for any medium or soft wood is the same for all pieces of the same thick-

While the pressure is being applied the liquid is also being heated by the steam coils, the effect of the higher temperature, and the increased pressure resultant from it, being important factors in the process. As the liquid penetrates the wood its volume is replaced, and the pressure maintained, by the automatic action of the accumulator, the pump of which is in constant slow operation, except when at the upper limit of its stroke ; then it engages a lever which shuts off the steam until it has descended a short distance. After the wood has been sufficiently treated the pressure valve is closed, the emptying valve opened, the unabsorbed liquid pumped back from the receiver to the tank, ready for use again ; and the receiver gate is again opened as at first described.

The wood, now thoroughly saturated, and, consequently, nearly double its original weight, is then run into the drying kiln, which is a large room fitted with heating apparatus. In from three to ten days a load of wood of average thickness should be dried, that is, the aqueous portion of the solution has been drawn off, leaving the fire-proofing ingredients closely incorporated with the cellulose in the pores of the wood.

WHAT IS CLAIMED FOR THE PROCESS.

A CLEAR and comprehensive idea may be formed of our process of fire-proofing woods, and the result obtained therefrom, by a perusal of the following answers to questions which have been asked by many inquirers:

1. What does the Company claim for its process?

Answer: It claims that wood treated by its process is rendered flame and fire resisting to a degree never before known in the history of wood. Lighted gas jets, electric wires, live coals, and similar sources of fire that usually set woodwork in flames, have no effect on fire-proof wood beyond carbonizing the same at the point where the fire touches.

2. How does the process bring about this result?

Answer: The process consists in impregnating wood throughout its pores and

ness; it is 40 minutes for one inch, 50 for two, 80 for four, 95 for six, 135 for eight, 174 for ten, and longer in proportion for greater thicknesses. The impregnation averages 50 per cent. higher than is necessary to make the wood fire-proof, and the figures show the rapidity with which a high degree of saturation is accomplished by this process. Oak and yellow pine are more resistant, but can be thoroughly saturated to the same degree as the soft woods in slightly longer time.

Philadelphia, show the averages of the treated woods to be above the results obtained from untreated woods off of the same pieces. The results of numerous independent tests show scarcely any variation between the treated and untreated woods, and the actual experience of using the treated woods, by reason of the antiseptic and preservative qualities of the fire-proofing liquid, will undoubtedly produce results in favor of the treated woods for all practical uses.

6. Has the wood treated by your process been tested for alteration in the modulus of elasticity, in compression strength, breaking strength, and other ways by eminent scientists, who can certify to the facts?

Answer: It has, and the tests made and our experience enable us to assert that the original qualities of woods are not injured by this treatment.

7. Can you treat all woods?

Answer: We treat every kind of wood. Some varieties, such as ash, beech, cedar, cherry, elm, pine, and walnut are easy to treat compared, for instance, to mahogany and oak, but oak and mahogany and the other woods named, can be perfectly treated,

fibres (not under vacuum) by hydraulic pressure, with fire-resisting chemicals in the form of solution, subsequently evaporating such solution and leaving deposited in the pores of the wood minute crystals which are fire-proofing and antiseptic.

3. Is the treatment permanent?

Answer: It is. The salts used suffer no diminution in weight by indefinite exposure to heat, dry or moist, or ordinary atmospheric air through evaporation; therefore it is a palpable fact that the same salts crystallized in the cells of the wood where they have been forced by great hydraulic pressure, properly controlled and regulated, are absolutely protected and cannot evaporate, and this is confirmed by the actual use of the woods.

4. Does the treatment increase the weight of wood?

Answer: Yes, from five to nine per cent., depending upon the original weight and character of the wood.

5. Does the treatment injure the wood for structural purposes?

Answer: It does not. Certificates of many tests made by Riehle Brothers, of

Answer: The chemical liquor is non-corrosive, non-hydroscopic and non-volatile. The liquor has been in our cylinders and tanks, passing through and over brass, iron and steel for months and no sign of the least corrosion is visible. The hardest test would seem to be the alternation between wet and dry, cold and heat, where contacts of the liquor are formed with all these metals, and so the evidence is conclusive after nearly one year of actual use.

13. Has the Company made a sufficient number of tests to prove that the results obtained are reliable?

Answer: Yes; the testing and experimenting plant at Philadelphia has been in daily practical service and used for scientific and public tests since August, 1899. The tests have not been simply laboratory demonstrations, but have been made with a plant of a size that proves that the tests are applicable to woods of any dimensions required for commercial purposes. The work has been done with a demonstrating plant, having a round impregnating cylinder ten feet long, and of an inside diameter of eighteen and one-half inches.

14. What has been the result of the

and our investigations show that they can be *heart-treated* only by our process.

8. Can you treat any thickness of these woods?

Answer: We can and do treat all sections of these woods thoroughly. Of course, the heart-treatment of large sections requires longer time and is charged for at higher prices than the treatment of the softer woods in general use. It is purely a question of time, however, to overcome the excessive density of the hardest woods.

9. Does your treatment interfere with wood taking paint, varnish or polish?

Answer: Wood treated by our process takes paint, varnish and polish better than untreated wood.

10. Does your treatment make the wood harder to work with tools?

Answer: The treated woods are not any harder to work with tools.

11. Does your process season wood?

Answer: Our experiments show that the treatment perfectly seasons wood, and that it will not check, shrink or warp.

12. Have the chemicals which you use in treating wood by your process any corrosive action on metals?

REPORTS OF

CHEMISTS AND SCIENTISTS.

REPORT BY PROF. SMITH,

Director of the John Harris Laboratory of Chemistry, University of Pennsylvania.

PHILADELPHIA, PA., March 4, 1899.

J. C. SIMS, Esq.:

My Dear Mr. Sims:—Various samples of wood, after treatment by the Ferrell process, were exposed to heat in the air and in crucibles of platinum. They, in no instance, held flame after the removal of the lamps, nor did they impart flame to adjacent objects. Splinters, blocks and large pieces of wood were tested. Samples of untreated wood were subjected to the same tests and from their behavior it was evident that "fire-proof" could be unquestionably claimed for the "treated" wood. No destruction of the fibre, as the result of treatment, was noticeable.

Yours truly,

[Signed] EDWARD F. SMITH,
Prof. of Chemistry.

investigation of the plant and process by scientists, engineers and mechanics?

Answer: Reports of a few independent tests are appended hereto, and these investigations, as well as many others made from time to time, show that the following properties and results have been demonstrated:

That the process insures heart saturation within a remarkably short time, at a comparatively small cost to all kinds and sizes of lumber for commercial purposes.

That the fire-proofing liquor is effective and permanent in its action, and that it is non-corrosive, non-hydroscopic, and non-volatile.

That the treatment does not weaken or in any wise affect the fibrous tissues or cells, or otherwise injure lumber, nor change its color or other natural properties, but on the contrary the treatment does improve and tend to preserve it.

That the lumber thus treated is as easy to work with tools, and will more readily take and hold varnishes, paints and oils than untreated lumber.

That the lumber treated by this process will not hold flame or spread combustion, but is completely and permanently fire-proofed.

found that 55 per cent. only of the thickness of the wood had been carbonized—the remainder being intact. In addition, a pinch of ordinary gunpowder, placed on the upper surface of the piece of wood, had not been exploded. A small piece of untreated wood, of the same nature and of the same dimensions, exposed to the same flame, and under the same conditions, was entirely in flames at the end of twelve minutes, and was reduced to ashes in thirty-four minutes.

Second.—A stick of treated wood (white pine), 7 inches long by ¾ inch square, submitted to a Bunsen flame, allowing the flame to surround the piece of wood, was slightly carbonized at the spot covered by the flames, but not elsewhere. At the end of one-half hour the carbonization had not extended in an appreciable manner. A stick of untreated wood, of the same character and same dimensions, exposed in the same way, was entirely consumed in two minutes. Both of these experiments were conducted in still air.

In all of the preceding experiments the carbonization was produced without the slightest flame.

Third.—Having planed a piece of treated wood, the shavings when submitted to the Bunsen flame upon a piece of wire cloth were entirely carbonized without producing any flame.

REPORT BY PROF. L. BOISSE,

Officer of the French Academy.

(Translation.)

NEW YORK, April 30th, 1900.

MR. WALTER GEER, President,

New York Fire-Proof Wood Co.,

38 Park Row, New York City.

SIR:

I have the pleasure of submitting to you the result of the different experiments made by me at your request upon fire-proof wood treated by your process.

INCOMBUSTIBILITY.

First.—Having submitted a piece of treated wood (white pine), 10 inches long by 4 inches wide by 1 inch thick, to the flame of a Bunsen burner, exposing the flat part to the flame, carbonization was produced without giving out the slightest flame. At the end of one hour of exposure the carbonization of the wood had only extended one-half inch beyond the surface covered directly by the flame—this being due in part to the currents of air which prevented the absolute stability of the flame. Having sawed the piece of wood through the center of the part which was carbonized I

Second.—A small piece of treated wood of the same thickness was exposed to a steam bath for a period of five hours.

Third.—A small piece of treated wood was soaked in running water during a period of four days.

Shavings taken from the different pieces above referred to, when perfectly dry, were submitted to the flame of a Bunsen burner and in every case gave exactly the same results with respect to non-inflammability as the samples previously referred to.

Fourth.—I have examined very carefully two small samples of resinous pine submitted by you, which had been exposed to the weather upon the roof of the Broad Street Station, Philadelphia, for a period of two years and seven months. The piece of treated wood, when tested, proved absolutely fire-proof and non-inflammable, whereas the piece which had not been treated took fire and burned brightly on simple contact with a lighted match.

Fifth.—I have analyzed the water in which I had boiled shavings of treated white pine, and then left the shavings immersed during a period of fifteen days, without finding any trace of foreign matters.

I conclude, therefore, that the chemicals employed in the treatment of the wood must be non-hydroscopic and non-volatile, assuring permanence of the treatment and consequently

Fourth.—The same experiment made with the sawdust of treated wood also failed to produce any flame; having spread the same kind of sawdust upon a fire made of small pieces of resinous untreated white pine the fire was extinguished.

Fifth.—Having broken in two a small piece of treated wood I made the same experiments with the central part of the wood with the same results.

Sixth.—Having built upon a plank of treated white pine a pile of untreated wood, saturated with mineral oil, the pile of wood was consumed without communicating the flame to the treated plank—only leaving a slight carbonization of one-sixteenth of an inch in depth.

These experiments, as well as several others of the same nature, permit me to conclude that wood treated by your process is absolutely fire-proof and incapable of communicating flame by giving out inflammable gas.

PERMANENCE OF THE PROCESS.

The following experiments were also made with wood treated by your process:

First.—A small piece of treated wood one-fourth inch thick was washed and scrubbed both with ordinary soap and with sapolio at several different times and during a period extending in all over two and one-half hours.

finest kind of wood-sculptors' tools, and have then examined the edge of the tools under the microscope without finding that the tools had been in the slightest degree injured by the experiment.

I also submitted to a sculptor of wood, Mr. H. R. Houst, a sample of treated black walnut, upon which he made the same experiments that I had made, and reached the same conclusions.

I have the pleasure of quoting below the letter which he was kind enough to write me on this subject :

"The piece of black walnut which you submitted for my examination has been cut and recut by me in every way, with the grain and against and across the grain, without affecting in any respect my finest sculptors' tools. Furthermore, this piece of black walnut, compared with other pieces of wood of the same nature, is certainly of a texture more compact and more dense, but nevertheless in all respects perfectly capable of being carved with sculptors' tools."

After the different experiments above referred to, and many others also of the same nature, I feel assured that the wood treated by your system is rendered permanently fireproof and non-inflammable, and that the treatment does not alter the wood in any respect as regards its essential qualities.

[Signed] L. Bossie.

making it impossible that any corrosive action should be caused upon metals.

APPEARANCE OF TREATED WOOD.

At my request, samples of the following woods, furnished by Messrs. G. W. Koch & Sons, manufacturers of parquet floors, New York City, were treated by you, namely, white pine, white maple, mahogany, black walnut and white oak. After treatment I submitted the pieces of wood to Messrs. Koch & Sons for examination, and am authorized to transmit to you their opinion. They state that these different kinds of wood thus submitted to them after treatment, show no alterations in color. These samples were also worked,—that is to say, sawed, planed, and afterwards finished both with shellac and with wax, without the workmen to whom they were given being able to perceive the slightest difference in any respect between them and the ordinary untreated wood. The pieces of treated wood also took paint as well as the untreated wood, the cells of the wood, not having been obstructed by the chemicals, absorbed the oil and paint, thus assuring the perfect durability of the paints and stains employed in finishing the wood.

EFFECT UPON TOOLS.

I have also tested samples of treated wood, such as white oak and black walnut, with the

that the prepared wood was equal in strength and elasticity to the unprepared wood, and that the treated wood had lost none of its vitality in any respect; in fact, I noticed that some species of the prepared wood, such as yellow pine and wood that contained resin, proved even stronger, probably due to the pores being filled up with the salts used in the treatment, which makes the wood closer, harder and more solid.

WILL HOLD NAILS FIRMER THAN UNPREPARED WOOD.

I have tested the prepared wood by driving different kinds and sizes of nails—both wire nails and American nails into it, and in comparison with the unprepared wood found it required more force to draw the nails from the prepared than from the unprepared wood.

HAS NO INJURIOUS EFFECT ON TOOLS.

I found in planing, sawing, drilling, gauging, etc., that the edges of the most delicate tools were not affected in their use on prepared wood any more than on the unprepared woods.

CAN EASILY BE STAINED, VARNISHED, ETC., AND HOLDS BETTER THAN ON ORDINARY WOODS.

I have stained and varnished some of the woods in various ways, and find that the treated holds stains of all kinds and appears

REPORT BY CHARLES F. ALBERT.

(Manufacturer of the Celebrated Charles F. Albert's Grand Concert Violins and Bows.)

PHILADELPHIA, March 11th, 1899.

UNITED STATES FIRE-PROOF WOOD CO.,

GENTLEMEN:

I have thoroughly tested the samples of your fire-proof wood in various ways and find that the process is all that you have claimed for it. As a result of my experiments, the skeptical ideas which I at first entertained have been thoroughly changed with regard to the action and influence which the chemicals have on the woods, particularly with reference to the natural vitality, pliability and strength of the woods, the effect on sharp edged tools, also as to staining, filling, varnishing and glueing, also the result of thorough scrubbing, and finally with regard to the fire-proof qualities of the wood when exposed to strong flames.

VITALITY OF WOOD NOT AFFECTED.

I cut the prepared wood in strips of different sizes and lengths, and compared it with strips of unprepared wood of the same size, and found

held in the flames, and to my surprise it would not burn. This was a most satisfactory proof to me that the sample woods are thoroughly impregnated with the chemical, and that, however this may have been done by you, it has been well done.

ENTIRELY FIRE-PROOF.

By the following various tests which I have made, I became thoroughly convinced that the woods prepared and impregnated with the chemical salts like your samples are positively fire-proof. I tested the woods by planing off a handful of very fine shavings, and put them on a piece of platinum and held the same over a strong flame, and the pieces would not burn. I took some shavings from unprepared wood and tested them in the same way, and they immediately burst into flames. I took some of the shavings of the prepared wood and threw on the burning ones and the flames were extinguished. I then sawed up some wood, gathered up the saw-dust, and exposed same to the flames and found it would not burn. I put some benzine in a plate, set it on fire, took some saw-dust from the prepared wood and threw it into the burning fluid and the flames were immediately extinguished,—smothered. Such saw-dust would make an excellent fire extinguisher for family use. I also tested the yellow pine containing a great deal of resin by

richer; that the grain is filled up quicker, and holds varnish much firmer than in the case of the unprepared woods.

HOLDS GLUE WELL.

I split some of the samples of prepared wood and glued them together and found that it held as well as the unprepared wood.

THE WOOD WILL SPLIT IN A NATURAL MANNER AND ABSOLUTELY CLEAN.

I found from my experiments that the wood will split in a natural manner and absolutely clean and will not gore. It can be planed or sawed in any manner and form the same as natural wood and as easily as any of the unprepared woods.

NOT INFLUENCED BY BEING UNDER WATER.

I made some tests to find out what influence water might have on the prepared samples when thoroughly soaked, as in the case of long rains, or where, as in the case of a fire, water might be thrown upon the wood after it had become charred. I took a small piece 2" long by 1" thick from a larger piece of one of your samples of very soft white pine, put it under water and soaked it for 48 hours. When dry, I tested it by holding it in a strong flame but it would not burn. Not satisfied with this, I split it and cut out from the center a small piece of the size of an ordinary match. This I

soaking one end in machine oil, then held it in the flames, but it would not burn although the oil began to boil on the wood.

In conclusion, I think your process of preparing woods to make same fire-proof is one of the greatest inventions and discoveries of the present age, and I only hope that in the near future I will see sufficient wood prepared in quantity to supply all new buildings erected thereafter with such prepared fire-proof timber as your samples. What a great blessing it would be to live in a house and under a roof that one knew to be thoroughly fire-proof.

Yours very truly,

[Signed] CHARLES F. ALBERT.

FIRST PUBLIC TEST.

THE first public test of wood treated by our process was given on Tuesday, June 19, 1900, at the yards of the New York Ship Building Company, South Camden, N. J.

At this test there were present officials of the Pennsylvania and Reading Railroad systems, the American Steamship Company, prominent insurance men, architects, contractors and builders, and in fact representatives from nearly every walk in life, from Philadelphia, New York, Boston, Wilmington and elsewhere.

The following are reports of the test:

BEFORE THE TEST.

the house built of fire-proof wood the effect was remarkable, the flames from the fuel had died out, leaving no traces whatever, except a thin, charred and blackened surface, where they had come in direct contact with it. More wood soaked with oil was then piled inside the house, the heat being so intense as to crack and melt the glass, but with a similar result: it was impossible to set it on fire.

In addition to this test two other houses, 5 feet square and 6 feet high, had been built, one of fire-proof wood and another of ordinary wood, with live electric wires coiled around and through from floors to roof; the current was turned on, but no effect was noticeable on the fire-proof wood, save the blackening of it by the glowing wires at the points of contact, while the ordinary wood was in flames in six seconds, the tests terminating by the melting of the wires. Tests were also made with the Bunsen blast burner, and a flame of 3000 degrees Fahrenheit projected against the treated wood, a flame powerful enough to melt iron or copper, but the wood merely charred and glowed where the flame was directly applied, the part surrounding it remaining cool and unaffected by the intense heat.

The right to use the patent in New York and adjacent territory has recently been purchased by the New York Fire-Proof Wood Company.

WOOD THAT WOULD NOT BURN.

Interesting Test of Lumber Fire-Proofed by the Ferrell Process.

(Philadelphia Record, June 20th, 1900.)

A large party of representative business men of New York, Boston, Philadelphia and other cities witnessed a most interesting test of the merits of wood fire-proofed by the Ferrell process, at the New York Shipbuilding Company's big Camden plant yesterday. The process is controlled by the United States Fire-Proof Wood Company, which is almost entirely a Philadelphia organization.

For the purpose of the test two small buildings, 6 feet square and 12 feet high, had been erected, each built identically the same, except that one was built of ordinary wood and the other of fire-proof wood; the outside was built of white pine, the inside poplar, with cherry and ash casings, the floors of Georgia pine and the roof of cypress shingles.

Under each house, and against the sides, were piled shavings, cotton waste and wood saturated with oil, and at a given signal both houses were fired. In a few minutes the house built of ordinary wood was on fire, the flames spreading rapidly, and in sixteen minutes it fell to the ground in ruins. On

WOOD THAT WOULDN'T BURN.

Interesting Tests of a New Process of Fire-Proofing Lumber.

(Philadelphia Press, June 20th, 1900.)

An interesting test of the merits of fire-proofed wood, as prepared by the United States Fire-Proof Wood Company, of this city, under the Ferrell process, was made yesterday afternoon in the presence of a large number of capitalists, insurance men and lumber representatives at the plant of the New York Shipbuilding Company in Camden. Two frame buildings, 8 x 12 feet, the one constructed of fire-proofed lumber and erected by the United States Fire-Proof Wood Company, and the other of similar design and construction of non-fire-proof yellow pine, were fired simultaneously and under exactly similar conditions so far as the intensity of the fire was concerned.

In just 14 minutes after the match was applied the second building toppled over, its sides and floor having been almost entirely consumed by the fierce flames, while the building constructed of the fire-proofed lumber, although blackened and charred in spots where the heat had been most intense, stood intact, with the exception of one of the shutters,

which dropped off from the melting of the metal hinges.

When the fire which had been started under this building, had been extinguished, the doors and windows were opened and the interior of the building was found almost as cool as a refrigerator, with not a particle of evidence of the fire that had raged about its exterior for fully half an hour.

FIRE-PROOF WOOD.

Interesting and Successful Tests Made at the Plant of the New York Ship Building Company, in South Camden.

(Philadelphia Ledger, June 20th, 1900.)

A large party of representative business men, including officials of the Pennsylvania and Reading Railroads systems and steamship companies, architects, representatives of chemical plants, contractors and builders and, in fact, representative men from nearly every walk in life from Philadelphia, New York, Boston, Wilmington and elsewhere, gathered at the yards of the New York Ship Building plant, in South Camden, yesterday afternoon,

EIGHT MINUTES AFTER THE FIRES WERE STARTED.

the building continued to burn for a half hour, the only evidence of the fire was a charred and blackened exterior in some places, while the interior remained practically the same as before the match was applied.

Following this successful test a large quantity of oil soaked shavings and wood were piled around a fire-proofed box, made of ash, in the interior of the building, and this was also fired, and burned furiously for twenty-three minutes, when the box was pulled out, somewhat charred and blackened, and was then opened and the contents, consisting of 200 pamphlets, entirely uninjured, were distributed to the guests.

Two other buildings, five feet square and eight feet high, had been built, one of fire-proof wood and the other of ordinary wood, with electric light wires coiled around and through the structures from floors to roof. The current was turned on, 500 volts, and flames soon issued from the building not fireproofed, but the only effects noticeable on the fireproof building was the blackening of the boards at the points of contact with the wires. Tests were also made with the Bunsen blast burner, and a flame of 3000 degrees Fahrenheit projected against the treated wood, but it only charred at the spot where the flame was applied.

to witness a practical test of the merits of wood fire-proofed by the Ferrell process.

The tests were made under the direction of the officials of the Ship Building Company, and proved highly successful. Two small buildings, eight feet square and thirteen feet high, had been erected in the southern end of the yard for the purposes of the tests. One of these buildings was constructed of Carolina pine, without being fire-proofed, while the other was built of white pine, poplar, cherry, ash and chestnut, with cyprus shingled roof, the wood in the latter building having been subjected to the fire-proofing process. The buildings were supported on posts two feet above the ground, the lower portion being built of ash, with plenty of ventilation. Under each house and against it were piled shavings, oily waste and a large quantity of wood thoroughly saturated with oil.

At a given signal matches were applied to the inflammable material, and in a few minutes the flames were leaping high above both buildings, the intense heat driving the crowd back quite a distance.

In six minutes from the time the match was applied the building not fire-proofed was a roaring mass of flames, and in sixteen minutes the structure was totally destroyed.

On the fire-proof structure, notwithstanding the oil soaked wood both under and around

FIRE WAS POWERLESS.

Interesting Test Made of the Ferrell Process of Fire-Proofing Wood.

(Railway World, June 23d, 1900.)

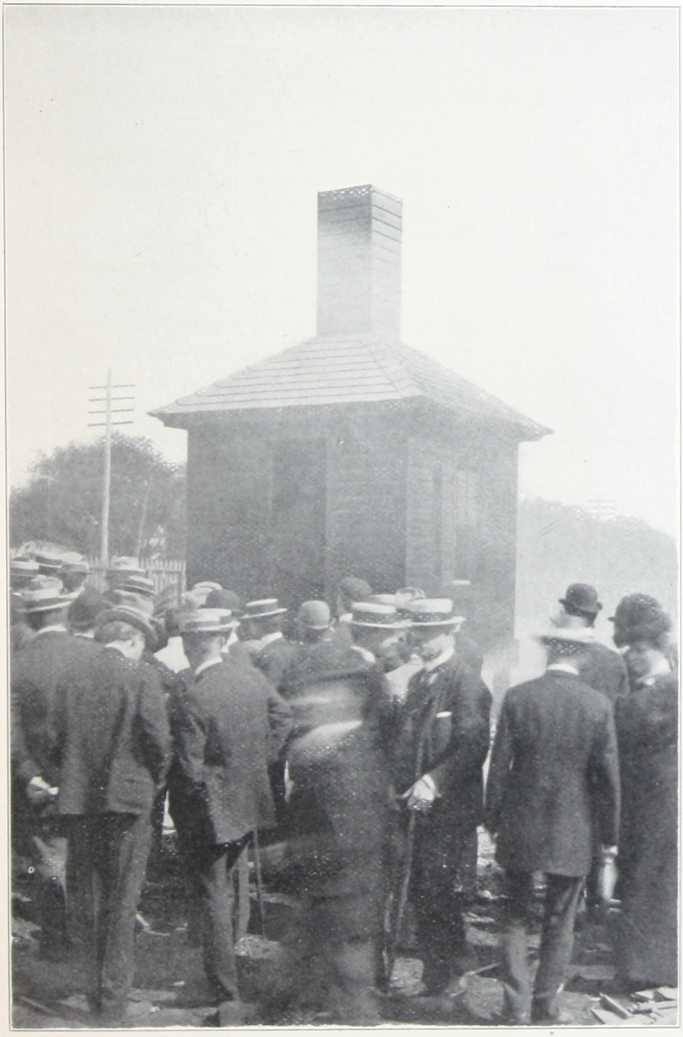
By invitation of the New York Ship Building Company a large and distinguished party of representative business men from New York, Philadelphia, Boston and other large cities gathered at their yards at Camden, N. J., on the 19th inst. to witness an extremely interesting and practical test of the merits of wood fire-proofed by the Ferrell process, owned by the United States Fire-Proof Wood Company, which is controlled by Philadelphians.

For the purpose of the test two small buildings, 8 feet square and 12 feet high, had been erected, each built identically the same, except that one was built of ordinary wood and the other of fire-proof wood. The outside was built of white pine, the inside poplar, with cherry and ash casings; the floors of Georgia pine and the roof of cypress shingles. The houses were supported at the corners, and raised two feet above the ground, with a large chimney in the centre of the roof and rising four feet above it; the lower portion

below the floor being built of ash and open lattice work, leaving it perfectly free to the passage of air. Under each house and against the sides were piled shavings, cotton waste and wood saturated with oil, and at a given signal both houses were fired. In a few minutes, the house built of ordinary wood was on fire, the flames spread rapidly, and in sixteen minutes it fell to the ground in ruins. On the house built of fire-proof wood the effect was remarkable. The flames from the fuel had died out, leaving no traces whatever, except a thin, charred and blackened surface where they had come in direct contact with it, just as would have been done to asbestos under the same conditions; but the house remained structurally intact and uninjured. More wood soaked with oil was then piled inside the house, the heat being so intense as to crack and melt the glass; this was done again and again, but with a similar result; it was impossible to set it on fire.

In addition to this test two other houses, 5 feet square and 8 feet high, had been built, one of fire-proof wood and another of ordinary wood, with live electric wires coiled around and through from floors to roof. The current was turned on, but no effect was noticeable on the fire-proof wood, save the blacking of it by the glowing wires at the points of contact, while the ordinary wood was in flames in ten seconds,

FIFTEEN MINUTES AFTER THE FIRES WERE STARTED.



AFTER THE TEST.

the tests terminating by the melting of the wires.

Tests were also made with the Bunsen blast burner and a flame of 3000 degrees Fahrenheit projected against the treated wood,—a flame powerful enough to melt iron or copper,—but the wood merely charred and glowed where the flame was directly applied, the part surrounding it remaining cool and unaffected by the intense heat. An exhibition was also given showing samples of the treated wood of all kinds, oiled and varnished, which showed that the treated wood could more readily take and hold the oil and varnish than the untreated. Pictures of the demonstrating and testing plant, which is located at 2218-20 Race Street, Philadelphia, where the process can be seen in actual operation, were also shown and the process explained. The demonstration was not merely to show that wood could be made fire-proof, for that has been done before, but to show that the Ferrell process is the only one yet invented which can, in a short time, heart treat thoroughly all kinds and sizes of wood, whether green or dry, in its natural state, just as it comes from the lumber yard, and without any previous boiling or drawing out of the natural juices, and that at a cost so very little higher than the untreated wood that it can be used commercially for all purposes, and not be confined to the higher grades of woodwork as

it has been heretofore; in fact, the wood can be treated in one-tenth the time and at one-fifth the cost of any other known process. The chemical solution used in the fire-proofing is non-volatile, thus insuring the permanency of the treatment; it is also non-hydroscopic and non-corrosive. It is forced in, under heavy hydraulic pressure, mechanically controlled, without in any way injuring the fibrous tissues or changing the color or natural qualities of the wood. The treatment in every way tends to preserve and improve the wood, making it take paint, oil and varnish better, besides being just as easy to work with tools as the untreated wood. The right to use the patent in New York and adjacent territory has recently been purchased by the New York Fire-Proof Wood Company, and they have now in course of erection at Long Island City a plant covering three acres of ground, and capable of treating 15,000,000 feet of lumber annually.